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The Intradermal Test in Bovine Trichomoniasis*

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Northern Ireland is essentially a country of small holdings, some 70,000 farms each possessing less than four cows, and so the use of the communal bull is a feature. In addition, the system of dairy farming is mainly on 'flying herd' lines. These two factors are ideal circumstances in the spread of trichomoniasis, a true venereal infection.

Early in the history of farming in Northern Ireland it was recognised that there was a group of conditions associated with breeding and observations showed that within that group were vaginitis, endometritis and pyometra. These conditions the farming community accepted in a fatalistic manner as a liability of stock rearing. However, in 1927 the problem became so serious that active measures were demanded. The agricultural organisers in the counties of Fermanagh and Tyrone estimated that there were particular areas where not less than two-thirds of the cows were barren. The report of the Ministry of Agriculture of 1928 showed that 20 per cent. of the cows during the previous season were sterile. Statistics over a number of years also indicated there was evidence of a rise and fall in the incidence of this disease. No effective measures had been applied to this problem and the farming community was left to its own resources, the affected cows for the most part being fattened off or sold as strippers.

During these years attempts to determine the cause of this condition were made along bacteriological lines. Many uteri from affected cows were examined but we were unable to show a common cause. Actually a few wet films were examined with negative results, the reason for this of course is now apparent to us. Nevertheless, the clinical evidence convinced us that we were dealing with an infectious venereal disease spread by the bull. On these grounds we introduced Neilsen's iodine treatment (1926) with a large measure of success; for example, in 1929 we treated some 867 cows with a percentage success of almost 80. We also advocated the irrigation of the bull after each service.

Our greatest difficulties were lack of education, the incomplete knowledge of the fundamentals of this disease and the inability readily to diagnose it. The need for education on this question is topical and very much an essential need; this applies both to the veterinary profession and to the agricultural community.

Trichomonas foetus was isolated and cultured in 1938 and since then we have devoted a great deal of time to its investigation. We have been fortunate in this work to have the collaboration of Dr. M. Robertson.

Diagnosis

The first approach in our investigations was to find an improved means of diagnosis. In our experience direct examination reveals the organism in one in 20 of infected cows; a positive finding excludes all doubts but there were too many negatives to depend upon this examination as a reliable form of diagnosis. Furthermore, some experience of trichomonads is necessary in making direct examination. The herd history was then, and is still, considered of first-rate importance.

The agglutination test we introduced in 1941. Since then we are still further convinced of its value. Our experience at Stormont has been enlarged in the last two years by the examination of almost 2,000 blood samples. Two points in its favour can be stressed:—

1. We have never found a positive blood test in a cow without there being a history of sterility in the herd, and
2. A positive blood test always indicates an active infection.

The test has two disadvantages:—

1. A trained worker is necessary to carry out the test, and
2. Cows with a mild infection may not react; bulls may be included in this group but are discussed later.

At the same time we must stress that this is a herd test and that it cannot be criticised from the viewpoint of the test of the individual. One or more positives amongst the samples from a herd indicates the diagnosis and line of treatment.

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The Intradermal Test

It was noted in our work that allergy was a predominant feature in the pathology of this disease and working on the assumption that the skin and mucous membrane share in the general sensitisation to various bacterial and protozoal diseases, we explored its possible uses as a test. Some success has been achieved in this direction.

No attempt will be made to describe the difficulties which arose in the preparation of a suitable antigen; the record here is that of the present state of our experiments. The test may be said to be in the nature of a fresh line of approach in the veterinary field and as such we ask for latitude; much of it is still under investigation and the shortcomings will, I hope, eventually be cleared up.

The Test

Site of inoculation—the skin of the neck as in the tuberculin test. In the bull the caudal fold is also used as the thickness of the skin of the neck sometimes makes a reading difficult. The inoculation is 0·1 c.c. "Tricin" intradermally. The injection should be made shallow: this applies more particularly in the skin of the bull.

The reading is made at 30 to 60 minutes. The reaction appears in ten minutes, reaches its peak at about 30 minutes, and disappears gradually in approximately six hours.

The Reaction

I wish to emphasise here that in reading this test a parallel must not be drawn with that of the tuberculin test. A shallow plaque is the characteristic reaction. This plaque is more obvious to the eye than the impression conveyed by actual measurement. It may only show an increase of 3 to 4 mm. Some very good type reactors have even been shown with an increase of only 2 mm. These were later confirmed by the finding of trichomonads in the uteri of the reacting animals. An increased measurement of 2 mm. and over is accepted as a reaction but I again emphasise that the reading must depend more upon the characteristic plaque than the measurement.

Some cows with an active infection, for example, pyometra, in their uteri may not show a reaction. These are connected with the stage of the disease producing a desensitisation of the skin and in these cases the reaction made its appearance following the usual treatment which removed the source of antigen. The reactions are the subject of investigations, the results of which will be published later. Our experience, however, shows that these cases respond well to the serological test. The reactions in the bull are much more definite than in the cow and they will be discussed later in this paper.

The test as we use it in field investigations is ready and rapid and the results when correlated with the history indicate the initial treatment and prevention to be carried out. We do not recommend that this test be interpreted in the individual case without a complete history of the animal or without being related to the result of the agglutination test. We find in the field that with this correlation the diagnosis may be given with assurance. In our experience we have not found a case of suspect trichomoniasis in a herd which yielded positive skin results that was not later confirmed by other means.

The reason for not accepting the test upon an individual animal without a history is simply that the skin test remains positive after the recovery of the animal and the disappearance of the positive blood test. The reaction thus may only mean a past experience. There are other anomalies to be considered.

The accepted difficulties of orthodox intradermal testing have not been lost sight of, such as non-specific reactions, and reactions produced by chemically but not biologically related antigens. Despite these, the test, as an adjunct to diagnosis, has been applied in Northern Ireland and when taken in conjunction with the agglutination test has considerably reduced the gap of undiagnosed cases. Perhaps we are optimistic, but we reckon that 90 per cent. of outbreaks can be definitely diagnosed by these means.

With the intradermal test the treated cow, the mildly affected cow and the bull respond best, whereas with the agglutination test the reverse is found.

Field Tests

Apart from the experimental animals used, the test before reaching general application was tried out in a large number of cows and calves in herds where the history was known. The results were entirely

negative. The following are the results of experimental tests carried out by general practitioners in two herds, one in Ulster and the other in England, and given as an example and indication of field results and their interpretation; both herds had a good history of sterility.

Table I

Number	Skin Measurement		History	Result
	Initial	One Hour		
Bull ..	16	26	Trichomonads demonstrated	Positive
Cow 1 ..	6	10	Mated by bull. Returned service	"
" 2 ..	7	10	" " " "	"
" 3 ..	6	9	" " " "	"
" 4 ..	6	10	" " " "	"
Controls: Cows Not Mated by Same Bull				
Cow 5 ..	6	7	In calf	Negative
" 6 ..	6	7	"	"
" 7 ..	7	9	"	Positive

The bull was later confirmed as positive by the agglutination test. Cow No. 7 is to be noted; the previous history of this animal was unknown and therefore the test result must be regarded as suspicious or an indication of a past infection.

Table II
Herd B. England

Number	Skin Measurement		History	Result
	Initial	One Hour		
Cow 1 ..	6	10	Returned service	Positive
" 2 ..	6	7	Normal calving	Negative
" 3 ..	6·5	8	" "	"
" 4 ..	5	7	Returned service. *T. foetus* found	Positive
" 5 ..	7	10	"	"
" 6 ..	5	8	*T. foetus* found	"
" 7 ..	5	6	Returned service	Negative
" 8 ..	6	10	Aborted	Positive
" 9 ..	5	7	Catarrhal discharge	"
" 10 ..	6	7	Returned service	Negative
" 11 ..	6	8	"	Positive
" 12 ..	5	8	*T. foetus* found	"
Bull A ..	11	20	Infected bull	"
" B ..	15	16	Unused bull	Negative
" C ..	11	12	" "	"

Bull A was the only bull used at time of testing the cows in the herd. Cows Nos. 7 and 10 can be regarded as infected although the skin reaction was found negative.

In the testing of young stock a further consideration must be borne in mind, the presence of a skin reaction in the calf. A series of experiments which Dr. Robertson and myself have just completed showed that when cows with a positive reaction to the agglutination test calve down they pass the immunity in a passive form to the calf. This transference by way of the colostrum takes place within the first 24 hours of the calf's life. This is followed by the appearance of a positive skin reaction which may remain until the calf is between 9 and 18 months old.

Abattoir Cows

Facilities were made available to test cows passing through the abattoir and to examine such uteri as were thought necessary. These cows may be accepted as having been cast for the usual reasons including mastitis, old age, abortion, sterility and poor milking records.

Number of cows tested 594
Number of cows positive to skin test 50
Percentage of reactions 12

The *post-mortem* examination results of the 50 uteri were as follows:—

1. Trichomonads confirmed by direct examination 11
2. Trichomonads not found by direct examination but serologically positive 8
3. Trichomonads not found by direct examination but serologically above normal 5
4. Trichomonads not found by direct examination and serologically negative 26

Numbers 1 and 2 indicated that almost 40 per cent. of the reacting cows were confirmed as trichomonad affected. Number 3, although suggesting some experience, was not included in the percentage figure as a confirmation.

There were many clinical features of interest in the examination of these uteri. Time, however, does not permit of a detailed description. Trichomonads were not demonstrated in the vagina of any of the eleven uteri confirmed by direct examination. In the majority of them the trichomonads were quite active but few in number. In only two of them were bacteria found in association with the trichomonad (*Corynebacterium pyogenes* and Type B streptococcus).

Twenty uteri from animals with a negative skin test gave negative results in the examination for trichomonads. This number is, however, much too small to be of value as a satisfactory control. The characteristic lesion present in the affected uteri was that of oedema.

The Intradermal Test in the Bull

One of the difficulties we found in applying the agglutination test to known affected bulls was the failure to obtain a sufficient number of positive reactions. Many of the bulls' sera fell into the category of above normals. In the case of the intradermal test, however, much better results have been found. The reason for this is perhaps associated with the slow and perhaps weak absorption of antigen that takes place through the genitals of the bull as compared with the rapid and extensive absorption from the uterus.

The skin reaction in some cases has been very definite, with increases of 10 to 12 mm. recorded. The caudal fold may exhibit a much better reaction than the neck area and even the tissue around the anus may become involved in the local reaction. This disparity we associate with the thickness of the skin, particularly in aged bulls.

Before applying the test in the field 30 young virgin bulls were tested and in no case was an increase of more than 1 mm. recorded.

On the assumption that apart from the venereal source of sensitisation not open to them bullocks would be likely to have similar possibilities of developing pseudo reactions, 50 bullocks were tested with "Tricin." In only one case did a bullock exhibit a swelling of more than 1 mm. This aspect of the work is under investigation.

Field Cases

In a period of less than three months tests were carried out in a number of herds with a suspicious history of trichomoniasis. Thirteen bulls were found positive to the intradermal test, in herds where trichomoniasis had been confirmed. These bulls were purchased for *post-mortem* examination, the results of which are as follows:—

Positive to direct examination 8
Negative to direct examination but serologically positive 3
Negative to direct examination and serologically negative 2

The second approach to investigating the intradermal test in bulls was the testing of bulls passing through the abattoir. The history of these bulls was unknown but it was notable that several were only two years old, which made the reason for their casting decidedly suspicious.

Number of bulls tested 65
Number of bulls skin positive ... 21 = 33 per cent.

Post-mortem examination of the 21 skin positives:—

Direct examination positive 3
Serological test positive 7
Total confirmed ... ... 9 = 42 per cent.

Ten bulls presented in a one-day test showed five positive to the skin test. The *post-mortem* examination results were sufficiently notable to record.

Table III

Bull	Lesions on Penis	Skin Test	Serological Test	Direct Examination
No. 1	Positive	4–10 (C.F.)	Above normal	Positive
" 2	Negative	15–18	Negative	Negative
" 3	Positive	14–21	Positive	"
" 4	"	15–19	"	"
" 5	Negative	15–20	"	"

C.F. = Caudal fold.

These results illustrate the difficulties of interpreting the skin reaction in the individual without a herd history as an adjunct. Moreover, it is fully realised that the communal bull some time during his mating life is likely to be exposed to infection which may lead to infertility and ultimate discard. Our experience indicates that the intradermal test is of value when applied to the bull within the herd. This diagnosis can be confirmed later by the agglutination testing of his sera and of the cows he has mated and which have returned to service or by direct examination of uterine discharges.

The request has been made to me that I should say a few words upon the lesions found in the bull.

The characteristic lesion is the evidence of granulomas on the surface of the penis. These granulomas are similar in nature to those seen on the vagina and are composed of a lymphoid tissue. They tend to zone on the dorsal and ventral surfaces, may be few in number and are only seen on close inspection or so numerous that the penis on palpation has a hard and irregular feel. These granu-

lomas bleed readily and after completion of a service the small haemorrhages are quite apparent as the bull retracts his penis.

The presence of trichomonads was confirmed in the urethras of three of the bulls and in the epididymis of one. As clinical findings these are disturbing for the success of treatment.

Lazy Service

The clinical history of the affected bulls in these outbreaks showed that most exhibited 'lazy service' in some degree; two were quite unfit to complete service.

There is a group of other lesions—adhesive orchitis, urethritis, epididymitis—which, in the field, we have found in association with *Trichomonas foetus*. At the same time, however, we think that the presence of secondary bacteria should not be overlooked as we isolated *Corynebacterium pyogenes* and *Streptococcus viridans* in two of the cases.

The treatment of the bull has been of little value. This is an aspect of our work that we have not touched upon to any great extent but we propose to do something more in the future. At present several bulls are being treated. I will not attempt, however, to promise success; my pessimism would preclude that. My great problem will be to find means of determining satisfactorily when the bull is free from infection.

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APPENDIX

Preparation of the Antigen—"Tricin"

Living trichomonads obtained by centrifuging glucose broth cultures grown in 20 oz. bottles are subjected to two washings with sterile normal saline solution to remove the soluble traces of the media. The next stage is the laking of the organisms, which is done by placing the centrifuged organisms in distilled water. The laking takes about one hour. After laking the suspension is centrifuged to remove debris and particulate bodies. The supernatant fluid is then treated with trichloro-acetic acid to precipitate the antigen. The precipitate is then washed in acetone then twice in anhydrous ether. For storage purposes the precipitate is dried and powdered and in this stage keeps indefinitely.

For the preparation of "Tricin" the precipitate may be washed in alcohol and then extracted by a solution of disodium phosphate (11·8 grammes per litre). This is done by placing it in a water bath at 40° C. for one hour with frequent shakings in the interval. One c.c. of the precipitate, or 0·1 gramme of the powder, to 25 c.c. of the disodium phosphate solution is the usual dilution for extraction. The extract is then centrifuged and neutralised by an acid phosphate solution (9 grammes per litre) and finally merthiolate is added to make a 1-40,000 dilution. Phenol was found to denature the antigen.

Standardisation of the "Tricin" may be undertaken by a nitrogen estimation. This method, however, fails to indicate damage to the protein molecule. Another method and one which we employ is to inject 0·1 c.c. of various dilutions of the antigen into a standard reacting cow. The dilution accepted is the one which is the highest and yet gives the requisite reaction.

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Discussion

Mr. D. L. Stewart: Firstly, I wish to congratulate Mr. Kerr on the excellence of his paper, which contains abundant food for thought. This paper, and others published by Mr. Kerr, are evidence of the efforts that he and his collaborator, Dr. Muriel Robertson, are making in the task of solving the mysteries of trichomoniasis. Those of us who work in the field appreciate the magnitude of this task and the veterinary profession is indeed grateful to these two workers. Although I appreciate the honour of opening this discussion, it is with certain feelings of trepidation that I will endeavour to set the ball rolling, having little experience of the most important part—the "Tricin" test. In passing, it is well worth noting the percentage success from Niels n's iodine treatment in Northern Ireland. This confirms that iodine is still the best general treatment for endometritis and trichomoniasis.

The paper is based on diagnosis. The difficulties of diagnosis of trichomoniasis in the past need not be emphasised and Mr. Kerr has gone to considerable effort to ease this problem. Until accurate diagnosis is possible, complete control will be impossible. We are still largely in the dark regarding the true incidence of trichomoniasis in Britain, and many reports of the disease are based on histories alone; this is not sufficient, and so any step forward in diagnostic methods is a real advance.

The paper reviews the present position and then comes the "high light"—the "Tricin" intradermal test—the most promising development in diagnosis since the introduction of the agglutination test. Mr. Kerr describes the disadvantages of the latter test and the advantages of the skin test: the saving of time and the simplicity of technique.

Let it be noticed that Mr. Kerr is modest in his claims, but even granting him some latitude, there are still some difficulties that occur to me. His explanation of the technique and description of the positive skin reaction are very clear but I am a little concerned about the reading of the test. One is very tempted to draw a parallel with the tuberculin test, though Mr. Kerr says we must not. Still, it must be admitted there is a little room for certain comparisons. For example, an increase of 2 mm. and over being considered a reaction. Can a 2 mm. skin increase be measured by the ordinary type of callipers? I doubt it and consider a 4 mm. increase the smallest reliable measurement under field conditions.

Character, then, assumes greater importance, and members will recall endless debate on character in the early days of the tuberculin test. The reading of the test hinges on whether the reaction is sufficiently characteristic. It appears to be, but I am just a little wary of a test that depends largely on a personal interpretation. Mr. Kerr has indicated that work is proceeding on the antigen and an improved "Tricin" might eliminate those criticisms. The short duration of the reaction is interesting and I would like to ask if there is any explanation for this?

I should also like to hear a little more of Mr. Kerr's experience with other antigens. For instance, a temporary reaction not unlike the one described has been found, using tuberculin. This occurs within the time limits of the "Tricin" reaction and is probably of non-specific protein origin.

The reactions in young cattle are most interesting and might cause complications in the field use of "Tricin." And so I would like to know if this has been found occurring in natural infections or only under artificial conditions? Useful evidence is provided by the abattoir cows and the percentage confirmed is exceptionally good—however, it is just a pity that a larger number of "Tricin"-negative cows were not submitted to serological and direct examination, although I admit that this is a monotonous and arduous task.

Here I might ask Mr. Kerr to say a little about the clinical features he mentions on the *post-mortem* examination of uteri. This I am sure would be of interest to a meeting largely composed of clinicians.

The picture in the bull I find much more promising, particularly when I recall the special difficulties of diagnosis in the male. The reports on field and abattoir cases are again excellent and 42 per cent. confirmed compare remarkably closely with the similar findings in the cow. The high percentage of serological positives in the bulls examined at the abattoir is remarkable.

Table III shows the difficulties of interpreting skin positive reactions without a herd history. And so when it is stated that "the intradermal test is of distinct value, when applied to the bull within the herd" and should be confirmed by testing the cows by other means, one is apt to ask oneself, "Does this test take us much further forward?"

Let us go back and consider the results. On the credit side we find:—

1. All herds suspect of trichomoniasis giving skin positives were confirmed by other means.
2. All cows from herds with clean histories gave negative results.
3. The combined methods should make a positive diagnosis in 90 per cent. of affected herds.

That is very encouraging, but is to some extent balanced by the fact that the best reactions are found in: (1) The mildly affected cow; (2) the treated cow; (3) the bull.

It is noticeable that in the acute active infection reactions are poor and diagnosis has to be made on serological and direct methods. Yet, in practice, it is in the acute infection that positive diagnosis is most often required.

I am very much interested in the mildly affected cow; in a recent paper Mr. Kerr described the artificial infection of clean maiden heifers *per vaginam*, which bred normal when served, although trichomonads were recovered later from their vaginas. I wonder if Mr. Kerr could tell us something about those mild or low-grade infections in the field? Information on the mild infections is vital to the control of the disease. Such mild cases have been suggested as the hitherto unexplained cause of outbreaks of trichomoniasis in self-contained herds. This also makes one wonder if the trichomonad may yet prove to be a normal inhabitant of the bovine genital tract. What then, causes the flare-up or increases its pathogenicity?

Here I might ask about something that has intrigued me for a long time. I have heard it reported that trichomonads have been recovered from maiden heifers and virgin bulls. Is this statement true? If so, could Mr. Kerr throw any light on the origin of these trichomonads and the significance of the findings? If we assume that such mildly affected animals are dangerous, then the "Tricin" intradermal test will be of immense value, as many of the cows may be identified before the damage has been done. Mr. Kerr has already remarked that "mild infections may not react to the agglutination test."

I am glad that Mr. Kerr has emphasised the case of the treated cow; this is of practical importance, but I see a little difficulty in the case of the animal that recovers spontaneously, *e.g.*, the mildly affected cow.

The intradermal "Tricin" test is of value as an addition to the clinical and serological examination, but it does not take us past the stage of herd diagnosis. I might venture to say that further work will have to be done in relating the skin-test to field infection, before it is ready for general application.

So it would seem that in the acute stage, we must rely on the serological and direct examinations. I would like, therefore, to dwell for a moment on the direct examination of vaginal discharge. My personal experience, though only on impression, has been that I have always found trichomonads in herds where I expected to find them, and have never found them where I have been in doubt of their existence. Recently, in an acute outbreak, I found trichomonads in six samples of vaginal discharge out of six taken. These samples were taken within a week of early abortion or the equivalent return to oestrus. This result is unusual, but it suggests that if practitioners looked for the trichomonads at the optimum time, their efforts might be rewarded more frequently.

In his work Mr. Kerr must have given considerable thought to the immunological aspect of trichomoniasis, and so I should like to ask his views on the resistance of treated cows to re-infection. It has surprised me how well treated cows breed, when an infected or doubtful bull was used. I can quote two herds where the treated cows under doubtful circumstances have bred almost 100 per cent. normal.

When one considers the comparatively low incidence in relation to the traffic in cattle and the behaviour of certain herds, one has to consider the possibility of trichomoniasis being to some extent a self-limiting disease. The danger in this view is that the source of future outbreaks may remain. Are there many spontaneous recoveries, in Mr. Kerr's opinion? It appears that by adequate treatment a herd will continue breeding and the disease die out provided the young stock are mated to a clean bull. The danger in this country seems to be the all-too-frequent occurrence of secondary infection, in which case the animals are often very resistant to treatment.

The description of the lesions in the bull and the finding of trichomonads in the urethra and epididymis, emphasise the need for very careful selection of bulls for the purpose of artificial insemination. One should never lose sight of this danger. Artificial insemination appears to be the most promising me h d of controlling trichomoniasis. There are certain difficulties to be overcome before this method will be general, but our experience so far has been very encouraging.

Mr. Kerr finds the treatment of bulls of little value, and the result of the work in progress will be interesting. My own experience is limited, as I usually recommend discarding the bull, but where I have carried out treatment and used him on treated cattle the results have been good. I have not yet recommended the use of a treated bull on clean cattle. Mr. Kerr raised the question of trichomoniasis affecting the fertility of the bull by having some pathogenetic effect on the sperm. In this I cannot claim wide experience since most infected bulls are slaughtered immediately the disease is suspected and the opportunity is lost. However, in the few bulls examined, some highly infective, the semen has been normal in volume, motility and density. Sperm counts were normal with no increase in abnormal forms. In the acute type associated with early abortion the bull must be fertile and I can see no reason for the disease having a dele erious effect on spermatozoa. The method I have used is that of Abelein and I found it quite practical.

I have bombarded Mr. Kerr with questions, but I do not expect him to answer them all: some are unanswerable at present. I have also been fairly critical—for this my excuse is good, being a newly elected member, and I must therefore endeavour to maintain the tradition of the North Wales Division.

Dr. Lamont said he had much pleasure in being present at the meeting and supporting his colleague Mr. Kerr. Trichomoniasis had been a grave problem in parts of Northern Ireland and the staff at Stormont had had considerable experience with it. He, personally, had carried out a large number of examinations of affected cattle. In some of these cases he had found on rectal examination an enlarged

firm, turgid uterus. This condition was certainly not pyometra but in the early stages of his investigations he often had difficulty in differentiating the condition from "early pregnancy." On *post-mortem* examination, the uterus was found to contain a large amount of gelatinous material between the muscular coats and the mucous membrane; this jelly-like mass was often up to 1 inch in thickness. Referring to the agglutination test in relation to trichomoniasis, at Stormont he had found taking six blood samples from the suspected herd usually gave them sufficient information on which to base a diagnosis. During more recent times, however, the laboratory had become "swamped" with blood samples and the need was felt for a "test" which could be applied on the farm. Mr. Kerr had done much valuable work to this end, and he (Dr. Lamont) had used the "Tricin" test on different herds on many occasions with gratifying results. In his opinion an animal which showed any reaction whatever should be regarded as positive since negative animals failed to give even a slight reaction. He stressed that great care should be taken not to use "Tricin" which may have lost potency.

Dr. Lamont quoted an example of twelve cows which had been mated and were found not to be in calf. They were examined by a veterinary practitioner who considered that trichomoniasis might be responsible. They were subsequently tested with "Tricin" and all animals, inciuding the bull, gave a negative result. Samples of semen from the bull were then examined and he was found to be completely sterile. The twelve cows were then mated with another bull and ten of them became pregnant after the first service. The pointer was, do not attribute every case of infertility to trichomoniasis without careful examination.

Concluding his remarks, Dr. Lamont said that certain work had still to be carried out with "Tricin," particularly with reference to its stabilisation. When this had been accomplished he had no doubt that the test would prove a useful and good means of diagnosis to the veterinary surgeon.

Mr. Williams Smith asked Mr. Kerr if he would define the phrase "successfully treated" as applied to cattle suffering from trichomoniasis.

Professor Wright referred to an outbreak which his department was first called to attend in the autumn of 1942. Of some 80 Friesian cows and heifers which had been exposed to infection, only 16 conceived and carried to term. Four developed pyometra, six aborted small foetuses early in pregnancy and the parasite was isolated from 13 others. In the cows a variety of treatments were applied. In the majority uterine infusion was employed and the solution used comprised iodine 1/1,000, metaphen 1/5,000 and mercuric chloride 1/10,000. Some exposed animals received no local treatment. The heifer received vaginal irrigation with iodine only. Pyometra in cows was treated by stilboestrol-pituitary extract followed by uterine infusion and in a heifer with stilboestrol-pituitary only. Service was replaced by artificial insemination using the semen of clean bulls. Results were the same—all except eight which were subsequently destroyed as sterile, conceived and but for two which aborted late in pregnancy (*T. foetus* not found) carried their calves to term. On no occasion had they been able to demonstrate the parasite after a normal calving. With regard to the two bulls which were transmitting the disease, they were unable to isolate trichomonads from them either during life or *post mortem*. Their semen was normal and they showed no reluctance to serve. One of them was given three months sexual abstinence during which period his prepuce was irrigated with metaphen and then he was used for artificial insemination. (Professor Wright commented that advice to destroy a bull of high pedigree and reputation was not readily acceptable by the farmer.) The question arose—what was the risk of infection in using the semen of a carrier bull by insemination? This case provided some evidence on the point. Of five cows which conceived to his semen, four carried to term and one aborted at 46 days and was positive for the parasite. The cow in question had not been exposed to infection before insemination. On *post-mortem* examination of the bulls the abnormalities of the genital organs found were—multiple small submucous haemorrhages of the glans penis and prepuce, and string-like adhesions between the parietal peritoneum and the tail of the epididymis. In one there was a small granuloma at the reflection of the prepuce. He could confirm Mr. Kerr's statement that in a number of infected cases there is enlargement of the uterine cornua; in fact rectal manipulation often provoked a muco-flocculent vulval discharge in which motile trichomonads could readily be demonstrated.

He wished that Mr. Kerr had referred at greater length to trichomonas abortions. Dr. Lamont and Mr. Kerr had recorded the discrepancy in the size of the aborted foetus in relation to the period in gestation at which it was expelled and had described the condition as arrested development of the foetus. He would put forward another explanation for this discrepancy, namely, that there was often a delay between the death of the foetus and its expulsion from the uterus. He ascribed this to delay in regression of the corpus luteum and believed it gave them a clue as to the etiology of pyometra. Gould had expressed the view that pyometra cases were originally pregnant; the foetus died, was not expelled and subsequently underwent maceration. Professor Wright agreed with Rowson and Sprigg and others that the essential feature of pyometra was persistence of the corpus luteum in the absence of a normally developing foetus *in utero*. He suggested that under its influence the endometrium underwent hypertrophic changes which rendered it susceptible to invasion by bacteria; in the case of the cow—corynebacteria. It was a striking fact that if the influence of the corpus luteum was removed, either by expressing the structure or by the administration of substances such as stilboestrol, the uterus evacuated itself and resolution could occur without any other treatment.

He was interested in Mr. Kerr's explanation of the greater reliability of the agglutination test in females than in males, which he ascribed to the greater facility of antibodies to be absorbed from the uterus. He (Professor Wright) believed the uterus of the cow to be remarkably resistant to absorption. He would quote the examples of the putrefying foetal membranes *in utero* and also pyometra. In the latter condition the uterus often contained several gallons of *C. pyogenes* pus, yet there was no evidence of toxaemia; the cow in fact was in excellent condition. Whereas if the same organism invaded the mammary gland the cow was often a wreck in a few weeks.

On five occasions he had found motile trichomonads in vulval discharges several days after iodine (1/1,000) irrigation of the uterus; in fact in some the mucus was still stained by the iodine. Two such cases conceived and carried without further treatment. He agreed with Mr. Stewart that recoveries were spontaneous. Although the withholding of service for several months might be a successful method of treatment, war-time conditions did not permit of it. Already there had been a serious loss in breeding time and it was essential that the cows be got into calf as quickly as possible. In his experience the problem could best be met by artificial insemination.

Mr. Steele-Bodger: He was not optimistic about the usefulness of "Tricin." He wondered whether it was necessary for the antigen used in a district to be made from the strain of trichomonad found in that district. He thought Professor Wright had been lucky in the results he had obtained and felt sure that had he been called to treat animals in another part of the country and carried out the same policy the results might have been much different. He considered that trichomoniasis was a widespread disease and existed in many more herds than those in which it had been diagnosed. On more occasions than one he had failed to demonstrate its presence even when he was convinced that it did exist.

Referring to treatment by the use of stilboestrol in oil, recently he had seen two cows which had been treated with this product. Neither of them had shown signs of recovery and when examined their uteri were found to be hard and contracted—something in the nature of a croquet ball.

He mentioned that he had seen cases of *C. pyogenes* infection together with copious discharge and had still found a living foetus. Such cases often persisted throughout pregnancy and yet a full-term calf was born. It was not uncommon, however, for incurable pyometra to follow such a condition. He agreed that *C. pyogenes* was found in the normal cow and that it was owing to certain as yet unknown factors that it became actively pathogenic.

Mr. Steele-Bodger commented on Mr. Kerr's comparison of artificial insemination with State service and asked if Mr. Kerr preferred artificial insemination as the lesser of two evils. He personally preferred artificial insemination and thought it would be of great use to the practitioner. Referring to the demonstrations witnessed that afternoon he said he had noted with interest that Mr. Stewart had used the rectal route for fixing the cervix. Personally he did not favour that technique because he considered it necessary that the vagina should always be examined by a speculum as certain conditions might be present which could not possibly be diagnosed per rectum.

With regard to the stilboestrol implant he had heard Mr. Stewart say that the tablets could be removed from the cow and used again. He did not think this was a good policy. The tablets after removal had lost a good deal of their potency and were often termed "ghost" tablets. If he remembered rightly, something in the region of 15 per cent. of the tablets was absorbed in three months. He himself had been pleased with the results obtained by such implants and he pointed out the benefits to be gained by producing extra winter milk by their use. He also commented on the fact that the ovaries were quiescent during the period of "implant."

Referring again to Mr. Kerr's paper, he noted that the essayist had used the terms "tolerance and resistance." He thought the difference between the two was slight but would welcome an explanation from Mr. Kerr. Commenting on the results obtained from laboratory examination of vaginal secretions, Mr. Steele-Bodger expressed disappointment and urged that much more work should be done on this aspect of the problem.

Mr. Shaw (Harper Adams) enquired if stilboestrol in oil or alcoholic solution should be used for treatment. He quoted a case which had failed to respond to repeated treatment of iodine solution in a strength of 1 in 400. Stilboestrol was subsequently injected intramuscularly and 50 c.c. was also injected into the body of the uterus. At an examination of the cow at a later date, trichomonads were demonstrated although the uterus, cervix and vagina appeared normal. He suggested two reasons for this failure to react to the treatment: (1) Stilboestrol did not reach all parts of the tract, and (2) trichomonads were accommodated in inaccessible sites.

Mr. Shaw then mentioned cases where the history of certain animals in a herd strongly suggested trichomoniasis but nothing could be demonstrated and suggested that if the 1/6 objective was used with an eye-piece of about ten magnifications the parasite could then be seen. They looked like cells in the discharge but could be picked out because of their wave-like motion. He warned practitioners that great care and patience must be practised in examining such samples if the correct conclusions were to be arrived at.

Mr. O'Neill: Judging from the evidence, it would appear that there was a higher rate of fertility obtained by artificial insemination than by direct mating. He wondered if the natural mating provoked a "stimulus" to the parasite which was not caused by artificial insemination.

Mr. Adamson: He understood that the parasite did not survive long outside the body. It was therefore necessary to examine the discharge as soon as possible after collection—within an hour if possible—and up to four hours was the maximum period. It would be of great assistance to the practitioner if a culture medium was available in which the trichomonads could live for 24 to 36 hours, thus making it possible for the material to be sent for laboratory examination. He asked if Mr. Kerr had any knowledge of such a medium, and also enquired as to the best method of collecting discharge. He personally used a clean jam jar and scooped the vaginal material into it. He thought the pipette method clumsy and not very practical in ordinary routine work.

Mr. J. H. Wynne enquired whether it would not be wise, in view of the seriousness of trichomoniasis, to make it a notifiable disease and schedule it under the Diseases of Animals Act.

Mr. W. Forgrave: Was it possible for a cow which had been treated to carry a full-term calf but remain infected until next pregnancy? Mr. Forgrave also enquired concerning the interval between irrigation, the strengths of solution to be used and the number of irrigations necessary to effect a cure.

Mr. Jones-Roberts enquired how soon trichomonads could be demonstrated after infection.

Mr. J. N. Bowen asked Mr. Kerr if he had had experience in Northern Ireland with a condition which might be described as a persistent catarrhal vaginitis which sometimes appeared as a sequel to chronic trichomoniasis. The condition was characterised by the appearance of inflamed patchy areas on the vaginal wall, with a variable quantity (usually slight) of viscous greyish discharge. The use of a speculum brought away the uppermost crust from these areas and left small bleeding ulcers, with the appearance of blood streaks on the speculum. He wondered if this might be a chemical inflammation brought about by over irrigation. In any case he found it the most difficult to treat of all conditions causing infertility. He also enquired if "Tricin" had been used as an ophthalmic test?

Dr. Taylor: He felt it had been a privilege to hear Mr. Kerr's paper and to listen to the discussion which had followed. Mr. Kerr's valuable work in Northern Ireland was well known and he was generally acknowledged to be the veterinary authority on trichomoniasis in the British Isles. Work on trichomoniasis on this side of the Irish Sea was far behind the work in Northern Ireland; we were still rather doubtful of its distribution in this country and in his view the afternoon's discussion gave adequate evidence of the uncertainty of our knowledge on many important points concerning the disease. He thought everyone must agree that the meeting had been a very good one indeed and was sure that one beneficial result would be to make us more trichomoniasis-conscious, and perhaps bring about the recognition of the disease in parts of the country where it had not yet been found.

His own experience of trichomoniasis was limited, both in the laboratory and in the field. He felt that such a test as Mr. Kerr had described that afternoon would be of the greatest possible service in the control of the disease among dairy cattle. It was necessary, however, to proceed with caution; some of the few tests which had already been carried out in this country had given results which had been difficult to interpret; false positives had occurred and it seemed not unlikely that the antigen was not yet sufficiently high specific to single out trichomoniasis with certainty. There was good reason to hope, however, that further work would eliminate these drawbacks and that in the future it would be possible to apply this test with assurance and derive all the benefit that might be obtained from speedy and accurate diagnosis. Finally, there was one question that he would like to ask. The occurrence had recently been brought to his notice of protozoal organisms other than trichomonads occurring in the semen of a sterile bull. These had not been seen by Dr. Taylor himself but had been seen by someone competent to recognise ordinary trichomonads: had Mr. Kerr any knowledge of such organisms, or did he think it possible that malformed sperm might have been mistaken for protozoa?

The Replies

Mr. Kerr thanked Mr. Stewart for the way he had opened the discussion. He thought he had been dealt with very lightly and was pleased to be afforded an opportunity of attempting to reply to the many interesting points raised.

Dealing with the points raised by Mr. Stewart, a comparison of the tuberculin and "Tricin" tests was open to objection because tuberculin was a very complex antigen which was somewhat unorthodox in that the late reaction appeared in 6 or more hours after injection. Antigens when injected into the skin induced an early reaction at 30 minutes, or a late reaction at two to four days and sometimes both. They had studied the early reaction in "Tricin," occasionally the late

reaction occur ed. In tuberculin the early reaction also occurred, but it was the late one that was followed. In ordinary antigen work the early reaction was by far the commonest.

On a few occasions he had found calves giving positive reactions on infected farms. The explanation of this lay probably in the fact that the infected dam passed on immunity to her offspring. On the subject of clinical features, on *post-mortem* examination he said he had found no inflammation in the uteri except in one case which was due to secondary infection with *C. pyogenes*. There was a charac eristic oedema—which was of an allergic nature—in the wall of the uterus which, when cut across, looked rather like the cross-section of a cucumber. There were no other pathological conditions.

Speaking of acute infection, Mr. Kerr agreed that some gave negative results but it was not customary to find infected herds which contained acute cases only and as the test was to be applied as a "herd test" the results should be satisfactory. As regards mild cases, he had demonstrated *T. foetus* up to the seventh month of normal calving but never after calving. He could not say anything beyond that, but he believed that it had been demonstrated in cows which have calved normally.

Mr. Kerr said that if *T. foetus* were a normal inhabitant of the cow one should get a systemic reaction in normal breeding animals. He did not think it was the normal inhabitant of he uterus, at any rate. It would be interesting to speculate whether some other factor made it virulent—possibly *C pyogenes*. The matter of trichomoniasis in virgin heifers was being investigated. It had however, been found in the virgin human.

On the question as to whether treated cows can be reinfected, Mr. Kerr quoted an example of three cows which had been treated and mated with a known infected bull. One of these was later found to be non-pregnant, one returned at six weeks and the third at eight weeks. *T. foetus* was found in one of them. He did not think treated animals had any resistance but they did have some degree of tolerance. He reiterated that treated animals could become reinfected.

He did think trichomoniasis was a self-limiting disease and quoted the example that in Northern Ireland when trichomoniasis had been suspected in a herd the farmer ceased breeding for six months and then mated with a fresh bull. The results were good. The reason he gave was that trichomoniasis died out unless mating was carried out and the uterus became gravid.

He was very much impressed with the possibilities of artificial insemination as a control measure. He did not think, however, that in the hilly districts it was a practical proposition for the local veterinary surgeon to create a livelihood. Furthermore, in these districts there was a great number of small farms which depended on a small number of communal or premium bulls, and when an outbreak occurred a practitioner coul not possibly cope economically, along the orthodox lines of treatment, with the number of herds involved. To his mind there were two possible solutions: (1) artificial insemination, or (2) as a safeguard for those areas where a veterinary surgeon could not work economically, a form of State veterinary service in which the cost of treatment would be subsidised.

Replying to Mr. Williams Smith's question, Mr. Kerr sai l a "successfully treated cow" meant a cow which had been treated twice with iodine. He ha l never been able to demonstrate trichomonads in properly treated cows after one irrigation. In the case of the three animals he had mentioned earlier they had been under constant supervision and had been examined seve al times before mating.

Answering Professor Wright, Mr. Kerr thought that his (Professor Wright's) iodine solution was too weak. He considered 1/400 was necessary to balance the dilution which occurred by contact with mucus. Stilboestrol had been used with a large measure of success; it was said to be lethal for trichomoniasis even in a dilution of 1/30,000. Referring to the different methods of treatment mentioned by Professor Wright, Mr. Kerr said mercuric compounds were very effective but there was a danger from their toxicity. They had been used in humans and although he could not give exact data he believed there had been deaths following their use. Concerning the greater reliability of the agglutination test in females as opposed to males this conclusion had been arrived at after testing a large number of case .

He agreed with Mr. Steele-Bodger that there were different strains of *trichomonas* and said that he knew that some strains varied in their agglutination. There was no reaction in certain cows. In regard to the success of "Tricin" they were experimenting to get a better strain, but there was much to be investigated. *C. pyogenes* was a common source of sterility for which, as far as he knew, no satisfa tory tre t-ment was known.

Regarding tolerance and resistance, resistance might be stated as the relation of the host to a given parasite and might mean a solid immunity, whereas tolerance might be expressed as a partial or low-grade immunity. In such cases the organism might multiply within the host and cause little or no disturbance; for example, typhoid and trypanosome infections T ere we e four types of *Co ynebacte ium* found in Northern Ireland, *C ovis*, *C. pyogenes*, *C. renale*, and a fourth which had no name.

Mr. Stewart, in reply to Mr. Steele-Bodger, said he had only intended to give members a glimpse of artificial insemination and artificial induction of lactation by stilboestrol. However, since Mr. Steele-Bodger had raised the subject he might say a little more. There was the economic aspect of artificial insemination to be considered. In his opinion the only way of working it was from a Centre attached to which there might be sub-centres. In general it would be impracticable to work artificial insemination together with a practice. The only likely way in which this might be done would be for a practitioner to have an assistant specialising in it. Mr. Stewart ran briefly through his normal day's work in support of this view. He did not think practitioners would ever be able to use artificial insemination as the time factor and disruption of normal work was against them. Regarding the technique, Mr. Stewart thought the rectal technique was the technique of the future but it required considerable practice. His reason for not using a speculum was that it was difficult to disinfect and he would have to disinfect it perhaps six times in a morning—not a practical procedure. As regards the examination of the vagina and cervix, Mr. Stewart said th t he had the advantage of knowing the previous history of all the cows he dealt with and t ere was also the difficulty of interpreting one's findings when using a speculum. One often found abnormalities which might make one hesitate before insemination, yet many of these animals conceived without difficulty.

He was not over-optimistic about the results of implantation. The results he had obtained were moderate and 50 per cent. of the cases might give economic milk yields. He had poor results in old cows and the best results in heifers. On the question of u ing the tablets again, he had said that they had been used but not by him. He agreed that they were merely "ghost" tablets and from 15 to 20 per cent. of their content had been absorbed. He did not recommend their being used again. He also agreed that the ovarie were quiescent during the implant. When the tablets were taken out the ovaries often became cystic but later returned to normal, and most animals were capable of breeding normally. More research was required in this interesting development in the use of hormones. *C. pyogenes* infection in the genitalia had not been commonly met by him in a chronic form. He had, however, come across what might be termed a sub-acute metritis, following calving, similar to that described by Mr. Steele-Bodger. Results had been poor at first but later changed treatment had met with considerable success.

In reply to Mr. Shaw, Mr. Kerr said that stilboestrol in oil should be used. Treatment in Ireland was evidently more simple. He had not experienced the trouble Mr. Shaw had in regard to the cows failing to respond to treatment.

It was quite possible that trichomonads might hide in the more inaccessible parts of the uterus and the possibility of cystic forms had also to be taken into account.

In certain mucous secretions trichomonads only showed slight flagella motion, and could only be picked out by experienced searchers.

Dealing with Mr. O'Neill's point, Mr. Kerr said that the bull acted as a vector but there was no reason why an artificially inseminated animal should not abort.

Replying to Mr. Adamson, the viability of trichomonads was variable. They were quite active in discharge up to 24 hours with no application other than normal saline. In c ilture there was the question of bacteria outgrowing the trichomonads: the bacteria multiplied and the *p*H dropped, causing the death of the trichomonads.

Concerning the methods of collection, Mr. Kerr said he used a tube of normal saline with a little gentian violet into which discharge was put. It was essential that the material should be warmed up before examination. A sterile pipette was much better than a jam jar which was not good owing to the risk of contamination. It was not wise to take the discharge from the vulva where bacteria were profuse.

Mr. Stewart thought it would be interesting to mention a case where a cow was visited immediately after an early abortion. The discharge looked like contagious abortion but on examination trichomonads were abunda t. On the third day after collection he examined the discharge again and found about 75 per cent. of the organisms were alive: re-examination on the fifth day revealed the percentage of viable trichomonads to be about 40. Mr. Stewart emphasised that warming up of the material was important.

In answer to Mr. Wynne, Mr. Kerr said it would be impracticable to make trichomoniasis a notifiable disease. If the disease was scheduled there would of necessity have to be legislation on the subject and the question of prosecutions for non-reporting would have to be considered. In order to make this possible there would have to be a 100 per cent. diagnosis, which there was not at present.

In reply to Mr. Forgrave, after a cow had been treated a clean bull should be used for the next service but it was possible for a cow to become reinfected. Trichomonads had been demonstrated in a cow carrying a full-term calf but never after calving a normal calf. Mr. Kerr said that in mild infection 1/400 solution of iodine was quite sufficient. If necessary the treatment could be repeated in 14 days. The quantity was about 3 to 5 oz., and should be injected just into the uterus. Replying to Mr. Roberts's question as to how soon trichomonads could be demonstrated after infection, Mr. Kerr said two days after bulling. They might not be seen again until next oestrus.

Referring to the condition described by Mr. Bowen, Mr. Kerr suggested that there must be a secondary infection present. He thought that irrigations with iodine should be limited to two. There was no point in irrigations over a long period and it was quite possible that harm might result by so doing. "Tricin" had been tried as an ophthalmic test but it did not give good results owing to the outpouring of fluid which followed application. This state was aggravated with the powder form of "Tricin."

Commenting on the protozoal organisms described by Dr. Taylor, Mr. Kerr said it was impossible to give an opinion without seeing the protozoa. He thought the organism was probably a trichomonad. In their work in Northern Ireland, so far during their examinations they had not met any mysterious Loch Ness monsters such as the one described.

REVIEW

[Diagnostic Methods in Veterinary Medicine. Geo. F. Boddie, B.Sc. [Edin.], M.R.C.V.S. pp. 328. Oliver and Boyd, Ltd., Edin. 15s.]

Recent developments in preventive medicine devoted to the maintenance of animal health have emphasised more than ever the importance of diagnosis. Accuracy in diagnosis is in fact of greater economic importance in the control and prevention of epidemics than in the treatment of individual cases. Professor Boddie is, therefore, to be congratulated on producing, at such an opportune moment, a book which clearly illustrates the diagnostic methods used in Veterinary Medicine.

Although all classes of domestic animals are dealt with the book is mainly concerned with farm animals.

Commencing with a description of the general examination of the patient, the clinical examination of the digestive, respiratory, circulatory and nervous systems, etc., is thoroughly considered chapter by chapter, and the associated symptoms are carefully discussed. A welcome addition to each chapter is a brief descriptive reminder of the regional anatomy.

Another important chapter is devoted to diseases of the skin and details the characteristics of the various skin parasites.

Tuberculin testing is fully described in a chapter dealing with allergic reactions and discussion of the interpretation of the comparative test should prove of particular interest to the reader.

There appears, however, to be no reference to the diagnosis of pregnancy and the various types of infertility or to the clinical examination of the bovine udder. In view of the importance attached to these methods it is to be hoped that these omissions will be remedied in another edition. That there will be another edition is certain, for the book not only deals with an important subject, but is written in such a clear, concise way by one well recognised as an expert in the realms of Veterinary Medicine, that it will undoubtedly come to be regarded as yet another "veterinary classic."

Weekly Wisdom

Gentlemen, I am a party man. I believe that, without party, parliamentary government is impossible. I look upon parliamentary government as the noblest government in the world, and certainly the one most suited to England. . . . Such are the beneficial consequences of this system, that, however fierce the controversial strife—however violent the agitation of the nation—still you will always find that when a question is settled by the legitimate influence of what the right hon. Gentleman calls "party," but which is in fact national organisation, the nation is content and satisfied with the decision; and you seldom see a question so settled reopened.
—Benjamin Disraeli.

CLINICAL COMMUNICATION

Propamidine in Wound Sepsis

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Sulphonamides in established wound sepsis are known to be limited in effect, as their action is inhibited in the presence of pus and tissue fluids. With this in mind it was decided that we should try out propamidine (one of the aromatic diamidines prepared in the research laboratories of May & Baker, Ltd.), in view of the recognised value of the drug in medical practice. To meet the varying conditions presented by superficial and deep wounds propamidine may be obtained in the form of a jelly or cream, containing 0·15 per cent. of the active substance.

The following is an account of the use of propamidine jelly in a small series of unselected consecutive cases, such as may be met with in normal everyday large- and small-animal practice.

CASE 1. *Subject.*—Cairn terrier with torn lower eye-lid. The wound, half an inch long, extended right through the lid at right angles to the edge. When first seen the whole eye and wound were covered with profuse discharge which was cleaned away and the wound packed with propamidine jelly and left open. Re-examined in 24 hours the wound was completely free from discharge. It was then dressed once daily, no further discharge appearing, and in five days was completely healed.

CASE 2. *Subject.*—Bull with a three-day-old wound, about an inch long, over the metatarsus partly severing the suspensory ligament. There was profuse discharge which was cleaned away and the wound packed with propamidine jelly and bandaged. It was left for three days, and when re-examined was free from discharge and granulating well. In a week the wound was completely healed over.

CASE 3. *Subject.*—Labrador with an abscess, deep seated, in the thigh muscles. When this ruptured there was a slough of skin about 2 inches square. The cavity was packed with propamidine jelly, and in 24 hours there was a marked reduction in the amount of discharge. In another 24 hours the discharge had ceased and the wound healed rapidly.

CASE 4. *Subject.*—Heifer with wound about 2 inches square, caused by wire, on the anterior aspect of the leg just below the carpus. This was seen within an hour or two of the accident and dressed with propamidine jelly and bandaged. After 24 hours the wound was perfectly clean and was again dressed with jelly. It was then left for three days when it was still free from pus and granulating well. After this the wound was left open and dressed daily and after a week was healed. The heifer was allowed out to grass and in spite of contamination when she lay down, the wound at no time showed any purulent discharge.

CASE 5. *Subject.*—Hunter mare with a deep transverse wound, about 6 inches long, across the anterior aspect of the hock. The injury, caused by barbed wire, had been done about twelve hours. When examined there was a considerable amount of serous fluid coming away from the medial commissure, giving the impression that either the joint capsule or the bursa under the cunean tendon had been damaged. The wound was cleaned up and packed with propamidine jelly, bandaged and left for 48 hours. When next seen there was a considerable amount of purulent discharge. The wound was dressed on four subsequent occasions at two-day intervals, making five applications in all. Each time the wound was dressed the amount of discharge was appreciably less. During the course of treatment the mare never went lame and the leg only "filled" very slightly round the fetlock and pastern. At the time of writing, 15 days after the accident, the wound has dried up and is granulating well.

* * * * *

In our opinion the results obtained were spectacular compared with those previously experienced with older treatments, and more extended trial is indicated. The high activity of the drug against strains of *Staphylococcus aureus* and *Streptococcus pyogenes* suggests it as being an interesting and valuable addition to wound therapy. A great advantage is that in most cases the drug need only be applied every two or three days.

ABSTRACTS

[Phenothiazine Salt Mixtures in the Control of Parasitism. BRITTON, J. W., MILLER, R. F., and CAMERON, H. S. (1943.) *Cornell Vet.* **33.** 339-343.]

In 1942 (*Cornell Vet.* **32.** 400) the same authors described their earlier success in the treatment of nematode infestations of Californian lambs on Ladino clover with mixtures of phenothiazine and salt. They have now extended their observations to two large groups of feeder lambs and to other sheep under a variety of conditions in California. Before the use of phenothiazine and salt mixtures drenching with cunic* at intervals for some four weeks until September was essential to the production in California of fat lambs on irrigated clover pastures. In spite of this cunic treatment at least 12 to 15 per cent. of lambs would never fatten and were placed in a dry lot in late October or November where they would do so. Most of the lambs suffered from parasitic gastro-enteritis, the commonest species being Ostertagia and Trichostrongylus. Gordon, H. McL., and Whitten, L. K. (1941. *Aust. vet. J.* **17.** 172) have shown that about 10 to 12 per cent. of lambs fail to respond to cunic because of the failure of the oesophageal reflex after stimulation with copper sulphate.

In the first experiment described in the present paper 198 lambs from one ranch were divided into two groups approximately equal in all respects and placed on the same pasture divided by a fence. Group 1 was allowed free access to a mixture of one part phenothiazine and 15 parts salt all the time; Group 2 had access to salt only. Group 1 gained 37·7 lb. (calculated on the difference between the average weight at the beginning and the end [July 7th] of the trial). Group 2 gained only 24·6 lb. in the same time. The rest of the flock of 5,200 head were kept all the time on the one in 15 phenothiazine-salt mixture and all were marketed, averaging over 100 lb. a head by the end of July. Only 32 lambs were lost, so that the usual 12 to 15 per cent. of unthrifty lambs were not found.

Experiment 2 was done on 3,100 lambs of which 100 controls were given salt only, the rest getting access to one in 15 phenothiazine and salt from June 15th. By July 31st, 1,200 of these and ten controls had been marketed as fat lambs. Three controls died of parasitism, but none of those on the salt and phenothiazine had died of it. The rest of the controls were scouring. Only 31 of the 3,000 put on the phenothiazine and salt were lost and these included cripples, theft, drowning and bloat.

The phenothiazine-salt mixture was then tried on 400 head of weaner Hereford calves on clover. The mixture was kept before them all the time; they did not take it readily as the lambs had done. By February all were scouring and their faeces showed 500 to 1,000 eggs per gramme. After doses of 1 oz. of phenothiazine in gelatin capsules they were, after two weeks, all back on feed, scouring had stopped and the egg counts were negative. A similar trial in May and June was equally unsatisfactory.

Referring to the lambs, the authors say that the lambs in Group 1 ate an average of 1 oz. of phenothiazine per head in two months, which cost 0·05 dollar per head; and the profit for 99 lambs was 189·09 dollars. Group 2 also showed a good profit and the owner said he had never seen lambs do so well in 15 years' experience. One breeder placed 1,000 pregnant ewes on this phenothiazine-salt mixture 30 days before lambing. All ate it readily and lambed normally. A month after lambing only ten ewes were scouring and needed tagging. Previously on cunic at least 20 per cent. had needed tagging. Similar good results were obtained by two other breeders. Further observations on the lambs described in the authors' first paper, which were allowed access to the phenothiazine-salt mixture every other month throughout the whole season, also showed good results. The method eliminates much labour and other cost due to individual handling for dosing, which retard the growth and feeding. Reference is made to two other United States reports of success with phenothiazine-salt mixtures.

G. L.

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[Copper Sulphate-Nicotine Sulphate Solution and Phenothiazine Compared as Anthelmintics for Lambs. WILLMAN, J. P., and BAKER, D. W. (1943.) *Cornell Vet.* **33.** 365-368.]

The authors took three similar groups of 28 lambs and placed them in a dry lot on October 2nd. The lambs were not suffering from parasitism and a table shows their worm burden, which was negligible compared with that of lambs with parasitic gastritis. Group 1 was given the regular treatment with copper sulphate and nicotine; Group 2 was given 0·5 gramme per lb. body weight of phenothiazine as a drench; Group 3 was given no treatment at all. The results

* "Cunic" is the name given to a mixture of copper sulphate and nicotine, commonly used for treating worms in sheep.

of examinations of the digestive tracts of 55 of the lambs are given in another table. It is claimed that there was no difference in the effectiveness of the treatments for the control of *Haemonchus contortus*. There were fewer *Ostertagia circumcincta* in lambs treated with phenothiazine than in those treated with cunic. Phenothiazine seemed to be more effective for the treatment of *Nematodirus spathiger*. All groups carried light infestations with Trichostrongylus, Cooperia and *Chabertia ovina*, but no conclusions are drawn about the effects of the treatment given on these species and on Moniezia and Trichuris.

G. L.

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["Nervous Distemper" in Dogs. A Pathological and Experimental Study. Hurst, E. Weston, *et al.* (1943.) *Aust. J. exp. Biol.* **21.** 115-126.]

From the brains of dogs suffering from clinical "nervous distemper" and showing lesions of a progressive encephalopathy characterised by demyelination, necrosis, and neuroglial inclusion bodies, the authors isolated a virus which was capable of producing in dogs and ferrets a disease indistinguishable from true distemper. By immunological tests, the virus of "nervous distemper" appeared to be very closely related to that of true distemper, and antidistemper serum was capable of neutralising the "nervous distemper" virus. Since it was possible to show that true distemper virus possesses an affinity for the white matter of the C.N.S., and there produces lesions of the same nature as those found in "nervous distemper," it is suggested that distemper virus may in fact be considered the cause of "nervous distemper." The development of the nervous symptoms in dogs that have survived the acute systemic stage of distemper may perhaps be explained on the ground that the distemper virus causes lesions in the brain during the acute phase, which thereafter progress because the "blood-brain barrier" protects the virus from the action of circulating antibodies.

The experimental details are presented in full, and the original article should be consulted by those interested. The conclusions reached differ from those of Perdrau and Pugh (*J. Path. Bact.*, 1930. **33.** 79), who doubted the identity of the demyelinating encephalomyelitis of "nervous distemper" with true distemper, since in their cases the temporal relation of one disease to the other was so variable, and the latter disease did not appear to be an essential stage in the development of the former.

E. C.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Aug. 19th.—Meeting of the North of Scotland Division, N.V.M.A., at Aberdeen (Marischal College), 2 p.m.

Aug. 30th.—Meeting of the Society of Women Veterinary Surgeons at Birmingham (Grand Hotel), 2.30 p.m.

Sep. 6th.—Meeting of the Association of Veterinary Inspectors, Crewe (Crewe Arms Hotel), 1.45 p.m.

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PERSONAL

Appointment.—Mr. Stephen John Watson, M.Sc., D.Sc., F.I.C., Director in charge of the Jealott's Hill Agricultural Research Station of Imperial Chemical Industries, has been appointed to the joint post of Professor of Agriculture in the University of Edinburgh and Principal of the Edinburgh and East of Scotland College of Agriculture. The joint post became vacant by the retirement of Professor Ernest Shearer.

. . . . .

Birth.—McAinsh.—On August 11th, 1944, at "Sunnyside," Brent Knoll, Somerset, to Lena, wife of A. McAinsh, M.R.C.V.S., a daughter.

. . . . .

Will.—Dr. A. W. Whitehouse, late Principal of Glasgow Veterinary College, who resided at Bearsden, left £11 522.

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R.C.V.S. OBITUARY

Dodd, James, Sligo, Eire. Graduated Dublin, December 15th, 1909. Died August 2nd, 1944.

VETERINARY EDUCATIONAL TRUST SCHOLARSHIPS

The Selection Committee of the Trust, of which the Duke of Norfolk is President and the Duke of Beaufort Honorary Treasurer, has awarded the first twelve Undergraduate Scholarships, now available through the generosity of Messrs. Joseph Rank, Ltd. and Messrs. Spillers, Ltd. More than 100 applications were received from as many different parts of the country. The educational standard was exceptionally high, and the Committee found it no easy task to make the final awards. Two Scholarships have gone to Scotland, one to Wales, two to the West of England, five to the North, and two to the South.

The number and quality of the applications for these Scholarships shows clearly the desire of many young people of ability to enter the veterinary profession if their financial circumstances can be eased.

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CHEMICAL WARFARE AND FARM ANIMALS

F.L.E.S. Lecture at Newcastle

On July 20th, under the auspices of the Farm Livestock Emergency Service, Major W. P. Blount, F.R.C.V.S., R.A.V.C., lectured on "Chemical Warfare and Effects on Farm Animals" to a representative audience of farmers, veterinarians and A.R.P. personnel. The lecture was illustrated by a number of lantern slides which showed the effects of gas damage in animals. Major Blount emphasised the necessity for speed in applying first-aid treatment after gas injury. If many animals were involved it was preferable to have a team of four people working, one to secure the animal, one washing out the eyes, one decontaminating the remainder of the body and a fourth preparing more bleach. An effective treatment is available against lewisite and will no doubt be issued by the authorities should occasion arise. The after-treatment of gas casualties is a matter for the veterinarian. Incendiary and other bombs containing phosphorus offer two hazards for farm stock, *i.e.*, burns and poisoning. The sign of phosphorus poisoning in the horse is colic of renal origin, leading to death in 24 hours. On *post-mortem* examination there is gastritis and inflammation throughout the urnary system. In the ox the kidneys are normal, but the large intestine is severely damaged. Fatty degeneration of the liver occurs in all species of animal. Major Blount was accorded a hearty vote of thanks for delivering what the Chairman (R. W. Bell Esq.) described as an intensely interesting and useful address.

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GUY SUTTON MEMORIAL FUND

The following additional donations have now been received:—

	£	s.	d.
Anonymous	3	3	0
Miss F. A. Wolfe	1	0	0
M. G. Sutton, Esq.	10	10	0
Mrs. M. G. Sutton	3	3	0
	17	16	0
Previously reported	1,208	0	6
	£1,225	16	6

As the Fund will shortly be closed, friends who desire to join in this movement to perpetuate the memory of the late Major Guy Sutton should send in their contributions as soon as possible to the Secretary of the Fund at 9, Red Lion Square, London, W.C.1.

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LEGAL NOTES

Unlawful Use of Description.—On Deighton Lionel Howard, of Bexley Hill, Lodsworth, being summoned at Midhurst for unlawfully using the description of veterinary surgeon, Mr. J. I. Eager, prosecuting for the Royal College of Veterinary Surgeons, explained that on January 25th defendant applied for petrol coupons, and in his declaration described himself as a veterinary surgeon, adding that the petrol was required for veterinary work.

Mr. I. Paterson, defending, said Mr. Howard was very well known in the district, where he had acted as an animal practitioner for 20 years. He was puzzled to know how to describe himself in the form, but he had never represented himself to the public as a veterinary surgeon.

The Bench fined him £1.

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As from September 1st next, all owners or shepherds of ewes in England and Wales eligible for Hill Sheep Subsidy will be entitled to a special ration of 42 lb. per month per dog. The coupons, which will be overstamped "Sheep dog," will be available for the purchase of ordinary cereal feeding-stuffs or in particular for National Pig Food No. 2, which feeding trials have proved to be entirely satisfactory for the feeding of sheep dogs.—*Farmers' Weekly.*

VETERINARY EDUCATION AND THE UNIVERSITIES

Nature devotes the first article of its issue of July 29th to an eight-column notice of the second report of the Committee on Veterinary Education in Great Britain. The latter half of the review is concerned mainly with the proposed increased connection between veterinary education and the universities, and is reproduced below.

The requirements detailed by the Committee for the choice of sites for veterinary schools are intimately bound up with one of the most important of the Committee's recommendations. This is the Committee's view that the best possible training for the veterinarian can only be obtained by persuading the universities to undertake the responsibility for it. This recommendation is an extension of the recommendation in the Committee's first report that there should be a close connection between veterinary education and the universities. It involves far-reaching changes, some of which are not, as recent correspondence in *The Veterinary Record* shows, acceptable to many members of the veterinary profession. The Committee's ideal is that veterinary schools should become parts of universities in the same sense as medical schools. This is already so in Liverpool. The Committee is satisfied that the following conditions should apply to all university schools of veterinary medicine. The necessary money should be provided by the State; the degree in veterinary medicine given by the university should become a registrable qualification; and the university should have a measure of control over the instruction given, and over the university examinations held, similar to that "generally exercised in the case of medical degrees."

While the Committee "favours the idea" that the universities concerned should establish new faculties of veterinary medicine, it does not make any definite recommendation on this point, because "so much depends on the conditions prevailing at each individual university." Many will regret the lack of decision in this matter. If veterinary education is to be undertaken by the universities at all, it must certainly be given, from the very beginning, an equal status with medicine, agriculture or any other university study which constitutes a faculty. It would be emphatically insufficient, for example, to create a department of veterinary medicine within, or subordinate to, any other faculty. The veterinary profession can only be given its legitimate place in any university by the creation of a faculty of veterinary medicine of full status, the affairs of which would be governed, like those of other faculties, by the veterinary staff in co-operation with other university teaching officers. In no other way would it be possible for the veterinary teacher as well as the veterinary student to take their full part in university life and to experience its full effects. By administering and teaching in a full veterinary faculty the veterinarian would, moreover, be in the best position to introduce effectively into the university those new problems and new spheres of work which could be such valuable additions to university studies. This contribution which veterinarians can bring to the universities is too easily overlooked. It has a very real national importance and no university can afford to neglect it.

While it is clear that the Committee desires the creation of faculties of veterinary medicine of independent status, it is no less clear that it emphasises its further recommendation that university degrees in veterinary medicine shall be registrable qualifications. There is a lack of clarity in the report on this point which requires elucidation. The Committee recommends that university degrees in veterinary medicine shall be registrable by the Royal College of Veterinary Surgeons and by that College alone; and it also recommends that the Royal College shall continue its own examinations and shall continue to grant the diploma of M.R.C.V.S. on the results of these examinations, which would presumably be held only in those existing veterinary colleges which do not, for one reason or another, become constituent parts of universities. There would thus be two possible veterinary qualifications—a university degree in veterinary medicine, and the diploma of M.R.C.V.S. granted only by the Royal College of Veterinary Surgeons on the results of its own examinations. The Committee's recommendation is that the Royal College of Veterinary Surgeons should be the only body legally empowered to register either or both of these qualifications, and to grant a licence to practise veterinary medicine. The recipient of a university degree in veterinary medicine would therefore have to register with the Royal College of Veterinary Surgeons, just as the recipient of a university degree in medicine or surgery must place his name on the Medical Register before he can practise.

It would further be necessary, the Committee thinks to create a body independent of the universities which would be empowered to secure a minimum standard of qualification to practise veterinary medicine. It is proposed that the Council of the Royal College of Veterinary Surgeons should be given this power. The College would therefore control both the education of veterinarians and their licence to practise. Its constitution would be widened and it would be given powers similar to those granted to the General Medical Council by the Medical Acts of 1858 and 1886, the relevant portions of which are quoted in Appendix VI of the Committee's report. These Acts would empower the new Council of the Royal College of Veterinary Surgeons to appoint inspectors who would have the right to attend, and report on, the examinations held at any centre, and to ask for details of the courses of instruction provided. If either these courses or the examinations were not considered adequate, the Council of the College could report to the Privy Council, which could declare that such courses of examinations should not qualify for a registrable qualification in veterinary medicine. The new Council's authority would also extend to veterinary schools which are not parts of universities.

It would thus seem that the Royal College of Veterinary Surgeons would retain all reasonable control of the profession. Some veterinarians have said that the proposals of the Committee involve the relinquishment by the College of the sole control over the educational standards of the veterinary profession in Great Britain which it now exercises; but other veterinarians have replied to this that, in actual fact, the College does not at present exercise this control. It controls only the examinations, and has no control over the instruction given in the existing veterinary colleges, nor any over the time which is given to the study of individual subjects in them.

Objections have also been raised to the Committee's proposal to bring into the new Council of the Royal College of Veterinary Surgeons certain persons who are not veterinarians. Here it should be emphasised that precisely four, and four only, of the 33 members of the new Council need not be veterinarians. The Committee does not, let it be noted, say that these four must not be veterinarians. They are to be appointed by the Crown; and no doubt the Crown will appoint, if not veterinarians, then men who have shown themselves to be sympathetic to the veterinary profession or to have contacts with it which have given them an understanding of its problems and aspirations. The profession itself is, moreover, to be given the majority vote in the new Council; for 17 of the 33 members would have to be freely elected by the profession precisely as the whole Council is now elected. The other 12 would be nominated by the universities and the veterinary colleges which would teach and grant the single registrable qualification. Twenty-nine members of the new Council would be veterinarians and a majority of the whole Council would have to be freely elected by the profession. If such a Council could not safeguard every vital interest of the profession, then the profession itself would alone be to blame. It is worth remembering, also, that the report of this Committee is not a series of edicts from which there is no appeal. It is a number of recommendations based on evidence taken from veterinarians themselves and from teachers of veterinarians, as well as from educational experts all over Great Britain; and these recommendations are put forward for calm discussion in Parliament and elsewhere.

The Committee was specifically asked to devise plans for the best possible training for the veterinarian, having regard to the anticipated expansion of the profession, and it believes that university training alone can effect this. There will be few who will not agree with this view. Many veterinarians are already taking university degrees of one kind or another as well as their veterinary training. This means as the Committee points out, that they have to take two or more courses, with the corresponding examinations, and must thus waste much time. One result, however, is that increasing numbers of veterinarians are learning by experience the advantages of university life, and most of them will be strongly in favour of the Committee's insistence on university education. They are by no means uncritical of the universities. No progressive mind is. Most people who have given any thought to the universities desire reforms of one kind or another. It is, in fact, one of the most valuable results of university education that it teaches men the folly and sterility of stagnation and satisfaction.

Veterinarians, moreover, like all men of science, must, as members of scientific research teams, experience that cultural effect of practical scientific work which teaches men to sink their own desires and differences and to pull their full weight for the achievement of a common aim. They may think that this is enough; or even that it is better than a university education. But surely the best university education is essentially an extension of this spirit, not only into the non-scientific world, but also into the social unit, the nation and finally the world. Men experiencing it cannot fail to become, as the Committee suggests, better men. "Universities," wrote Dr. John Murray in the *Sunday Times* (May 7th 1944), "can only vivify each new generation by witnessing to the common body of culture"; and he rightly pointed out that, in an age of specialism, we must compensate for specialism by common study carried out in a community. The logic of events, he writes, is making the universities the meeting ground of the youth of Britain

and of every other land; it is making them "agencies of mutual understanding, organs of a world spirit of amity and conciliation." The veterinarian should be included in this Parliament of Youth, for his work has a vital place in the development of civilisation. Dr. Murray thinks that the future of the universities may lie, not in great cities, but in small ones, in old and historic places, in the countryside where there is continuity with the past, in "places such as Oxford was and Cambridge still is." It is not irrelevant to add to these the Exeter from which Dr. Murray writes, and where he presides over an educational community which draws to its happy atmosphere students from all over the world. It seems a pity that this College, situated as it is in the middle of one of the greatest agricultural districts of England, cannot be given a part in the training of the veterinarians whose services that district must have. Would it not be possible, for example, to link it with the new centre at Bristol in some form or other?

Another aspect of the Committee's report remains for comment. The Committee adopts, on more than one page of its report, what some will consider to be an insufficiently firm attitude to the universities. The Committee, for example, "strongly urges" the universities giving registrable veterinary qualifications to include practising veterinarians among their external examiners, and to consult the Council of the Royal College of Veterinary Surgeons when they are appointing them. The College, of course, insists on the inclusion of veterinary practitioners as examiners in the clinical subjects, and many will think that the universities should be plainly told that they must establish a rule so obviously essential. Elsewhere the Committee says that it is "encouraged to believe" that one of the universities concerned "might be prepared to establish a School of Veterinary Medicine" such as the Committee proposes and to grant a degree in veterinary medicine, subject to the conditions which have been mentioned above. Of another university the report says that the Committee understands "that the university would not be adverse in principle" to its proposals. The position at another university centre is described as "exceptional." The remaining two universities have, however, expressed their willingness to carry out the Committee's proposals. There would thus appear to be a need for a reminder that all universities, jealous as they must be of their independence, also have a public duty in a matter of such national importance as this.

There is a spirit abroad among the young men of to-day which will not brook anything but a progressive spirit among its educational leaders. Certainly the veterinary profession has demonstrated that there are among its leaders men who are progressive, able and mellowed by a culture which extends beyond their own science and art. They have proved themselves to be wise administrators as well as first-class practitioners of their profession. They are, like the medical men, determined to uphold their just rights, but they are not willing to do this obstinately or to refuse that patient but firm conciliation which has always been the mark of the ablest men throughout the centuries. They are aware, like the leaders of the medical and other professions, that conciliation reasonableness and wise judgment are required of all responsible men at a time when the whole world is being reconstructed on a basis of goodwill and the best possible service by all for the greatest good of the whole. It is not to be expected that the authorities of British universities will be any less conscious of their national responsibilities, nor any less willng to reach a speedy and just solution of the relatively minor difficulties presented by the recommendations of this report.

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FOOT-AND-MOUTH DISEASE

Foot-and-mouth disease has been confirmed among cattle at Horsford, Norwich, and among pigs at Prestatyn, Flintshire, and North Ferriby, near Hull.

At a later date the existence of the disease was confirmed at Connah's Quay, while on Monday last extension to Scotland was announced, with confirmed outbreaks at Pitlochry and at Inchture, Perthshire, among pigs purchased at Perth Market.

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H.M. STATIONERY OFFICE PUBLICATIONS

The undermentioned has been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office.

	Price net s. d.	*Post free* s. d.
Public General Acts (7 & 8 Geo. 6) (Session 1943-44):		
Ch. 28. Agriculture (Miscellaneous Provisions)	0 3	0 4
Ch. 29. Food and Drugs (Milk and Dairies) ...	0 2	0 3

FIRST MINISTER OF EDUCATION

The Education Bill having received the Royal Assent, the King has approved that Mr. R. A. Butler, M.P., be appointed Minister of Education, and that Mr. J. Chuter Ede, M.P., be appointed Parliamentary Secretary to the Ministry of Education.

Mr. Butler was, until the passing of the Education Act, President of the Board of Education, a position which is now abolished, but he did not adopt the title of Minister of Education until his appointment by the King. Mr. Ede was Parliamentary Secretary to the Board of Education.

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MEDICAL FREEDOM TO PUBLISH

It is announced in the current issue of the *British Medical Journal* (states the Medical Correspondent of *The Times*) that the Secretary of the British Medical Association has written to the Secretaries of all the voluntary hospitals, and to the medical officers of health and to the clerks to the councils of all the major local authorities, on the subject of the freedom of the medical staff employed by these bodies to publish scientific papers without any restriction or the necessity to seek permission.

In many instances, especially in the local authority service, permission to publish even strictly medical articles in reputable medical journals has to be sought as one of the conditions of employment. Only last year, as a result of criticism by the B.M.A., the London County Council altered its standing orders to allow the publication of books or articles on "purely technical or scientific" subjects without prior permission from the Chief Medical Officer.

It is pointed out, however, that the previous order forbidding this course referred to "scientific or professional" matters and it is suggested by the *British Medical Journal* that this alteration has a particular significance at the present time. Doctors appear from the results of the recent questionary to be in favour of much that is contained in the White Paper on a health service, but they are very strongly against limitation of their freedom either as doctors or as citizens. A widespread response to the B.M.A. appeal by the local authorities at this stage would go far to remove a feeling of antagonism.

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PENICILLIN SAFEGUARD: MANUFACTURE ONLY UNDER LICENCE

Regulations have been made by the Minister of Health, the Secretary of State for Scotland and the Minister of Home Affairs for Northern Ireland bringing preparations of penicillin under the control of the Therapeutic Substances Act.

The effect of the regulations, which are designed as a safeguard against the sale of inferior and possibly dangerous preparations, is that preparations of penicillin may not be manufactured for sale except under licence and in conformity with prescribed conditions as to strength, quality and purity.

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The Food and Drugs (Milk and Dairies) Act has received the Royal Assent.

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Several famous racehorses, including the Ruhpoldinder hurdlers Mansura and Ripaton, which had been entered for the next Brown Ribbon, Germany's chief annual racing event, were killed recently according to the *Basler Nachrichten*, when the stables of a well-known owner, Christian Weber, were hit during an R.A.F. attack on Munich.

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At a recent meeting of the Executive Committee, Mr. J. L. Cridlan, Mr. W. J. Cumber, Mrs. G. M. Strutt and Mr. Hugh Wyllie were nominated to represent breed societies upon the Advisory Committee of the Ministry of Agriculture regarding artificial insemination. The Ministry has informed the Association that it is unable to comply with the request for a larger representation of breed societies thereon.

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Horses declined in number in practically all the belligerent countries on the Continent during the war. Over most of the area the decline by districts varied between 10 and 30 per cent. In the Western Front area, the Garonne Valley and Bavaria, however, the decline exceeded 30 per cent. The number increased in most districts in the years after the war, but decreased again during the '30s with the increase in motor vehicles.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal views of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

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SUMMER MASTITIS

A Note to Practitioners in South-West England

Sir,—During this winter there occurred a fairly considerable number of cases of *C. pyogenes* mastitis in dry cows, and this suggested that this summer might be a bad year for summer mastitis.

This indication has proved correct and during the past fortnight there has been a very marked increase in the occurrence of this disease, and experience suggests that this will continue until about the middle of September.

Practitioners in this area are, therefore, advised to bear the possibility of this disease in mind when considering abnormal cases of mastitis.

Summer mastitis, besides occurring in dry cows, can occur in maiden heifers as young as 15 months, and it is sometimes well over a week after the onset of the disease before the characteristic greenish yellow pus with a typical pyogenes smell is excreted from the gland. It is, moreover, sometimes four or five days before *C. pyogenes* can be demonstrated by laboratory methods in the milk. It is, therefore, suggested that in cases of abnormal mastitis in which the features are high temperature associated with a very hard bag and probably systemic disturbance in the cow, a dose of *C. pyogenes* serum should be given. At this stage the udder secretion may appear as a clear serous fluid with possibly a few purulent clots; the typical smell of *C. pyogenes* may or may not be present.

Other aids to diagnosis are: a stiff gait sometimes associated with swelling of one or more hocks; painful quarter; inappetence; the temperature remaining at a steady high level (seldom falling below 103°); no response to sulphanilamide. Smears of incubated milk samples stained by methylene blue or Neumann's stain show masses of beaded bacilli, which can at first sight be mistaken for staphylococci. Cells are seldom numerous.

The treatment depends upon the condition of the animal. Prognosis of the quarter is hopeless, but is good for the cow herself provided that serum therapy is resorted to. If no marked systemic disturbances are noted prophylactic doses of 20 c.c. serum subcutaneously may be given, or probably better still, the use of pyogenes toxoid should be resorted to. When systemic disturbances are severe large doses of serum (40 to 100 c.c.) may be given intravenously, followed by a course of toxoid or serum as seems indicated.

It is also suggested that the veterinary surgeons should warn farmers whose land contains a large number of trees and where flies are exceptionally prevalent, and especially on whose farms summer mastitis has occurred during the past few years, of the advisability of sealing the teats of all heifers and dry cows. The use of collodion fortnightly or of the bismuth boracic paraffin paste (recommended by the N.V.M.A. Survey Committee) every three or four weeks is advised; whilst there are theoretical grounds for resorting to the use of *C. pyogenes* toxoid, sufficiently controlled experiments have not yet been carried out to be dogmatic on the value of this product in the prevention of the trouble.

Two further points which will assist in controlling this disease are:—

Firstly to advise those farmers whose cattle have been affected with the disease to run them so far as possible on land away from trees and hence to lessen the danger of fly infestation.

Secondly, to note that one frequently finds that quarters of dry cows which have been infused with the acridine dyes in the routine control of streptococcal mastitis, develop summer mastitis if this disease is present on the farm. It is, therefore, suggested that infusion of dry cows might be discontinued until the end of September if the veterinary surgeon has reason to suspect summer mastitis on that establishment.

Yours faithfully,

R. W. Roach,
University of Bristol,
Department of Agriculture and Horticulture.
Agricultural Advisory Office.
22 Berkeley Square, Bristol, 8.

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VETERINARY EDUCATION: THE LOVEDAY REPORT

Sir,—Miss Uvarov sets forth her facts in such good order that they are almost convincing: almost, but not quite. Though she supports Mr. John Smith's quaint suggestion that we should at least show gratitude to the distinguished persons who have generously devoted time and effort to what some may consider as plotting our destruction, her arguments have a more genuine ring than Dr. Wooldridge's unsubstantial sophisms or the flowery scatterings of Mr. Paul Crosfield, who despises us so much because he feels sure our private libraries are by his standards too utterly low.

But the Loveday Committee would blast away our stout door, point to the jagged gap and say: "There is your one portal, just as secure as before." They would water down our Council to below proof and call it enhancement; then extend the powers of this Council which is no longer our Council to cover so much so thinly that there is left no more than the mockery of a promise of power. That is what I thought after four readings: because of Miss Uvarov's letter I have gone back for the fifth time and still find no comfort in paras. 14 to 16, nor in paras. 25 and 26, while as to para. 22—Oh! para. 22: "We strongly urge any universities which may be given power to confer registrable degrees to include practising veterinarians among their external examiners in clinical subjects. . . ." There is everlasting shame in the suggestion that power to confer registrable degrees should be given to those who have so little sense of direction and veterinary aim as to require to be "strongly urged" to take such a course, and an everlasting fear that to be strongly urged might not be enough.

We can be conscious of our shortcomings and of the need for vision and resolution to meet the future, and at the same time feel that at least we do know our own path and its outlets to a brighter destiny than that of losing our way and our identity in the shadowy academic groves.

Miss Urarov's exhortation that the report should be taken as a *whole* has something in it of the pill and the jam, and of the dog's lethal dose of strychnine rolled in meat. There is certainly good in the report. Once the Committee has skated over the thin ice of the great betrayal there comes much of which we must all approve and welcome, but it is no more than the profession and the public deserve, and it need not be presented as compensation for, or be contingent on, the destruction of the R.C.V.S.

Far from taking the report as a whole, I hope the Divisions will split it, cleave it in twain and "throw away the worser part of it."

Yours faithfully,

Bath. Esmond Brown.

August 6th, 1944.

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THE N.V.M.A. AND ITS STATE SERVICE MEMBERS

Sir,—It would be regrettable if the correspondence published under the above title gave the impression that there is a conflict between the Civil Service and the practitioner branches of the profession. Most, if not all, members of the whole-time Association appreciate that the N.V.M.A. must give due weight to the views of its majority membership, namely, the general practitioners. Conversely I think that most practitioners realise that the whole-time members have special problems to which the N.V.M.A. will give due attention if and when requested.

The present mild controversy, initiated by Mr. E. G. Morris, seems to arise from two recent causes. A few thoughtless practitioner-councillors made derogatory remarks about the veterinary inspectorate which were published. Then the recorded proceedings of the Society of Veterinary Practitioners gave the impression of an attempt to dominate. These have been read as reflecting the attitude of the N.V.M.A. On the other side, practitioners may interpret the comparative silence of the whole-time staff as indicating that we have neither contributions nor demands to make, not realising that silence is imposed by a rigid interpretation of rules governing the Civil Service. As an illustration of the latter, it is not generally known that for two years in succession whole-time members were refused permission to read papers at the annual congress because the subjects impinged upon departmental policy. In parenthesis, it is curious that the veterinary adviser to the Colonial Office contributed a most valuable paper on policy last year.

Consequently the Association of Veterinary Inspectors has the appearance of being a completely separate element among the Divisions. Mr. Watson and others may be interested to know that, in response to an invitation from the N.V.M.A., we presented our considered views on the future development of the profession as long ago as April 1943. That the separation is more apparent than real is evidenced by Dr. Wooldridge's quotation.

I think it is fair to say that the Ministry's whole-time staff look on themselves as veterinary surgeons first and Civil Servants second. If occasion should arise to test this view, and either the N.V.M.A. or the Association of Veterinary Inspectors have demands to make, I am confident that unity in all essentials will be demonstrated to the doubters.

Yours faithfully,

"Dungarvan," Downs Wood, Philip D. Baylis.
Epsom Downs, Surrey.
July 31st, 1944.